CLAIMS:

1. A method of communicating in a wireless ad-hoc network, comprising:

transmitting data to a first receiver included in a wireless ad-hoc network over a first channel determined by the first receiver; and

transmitting data to a second receiver included in the wireless ad-hoc network over a second channel determined by the second receiver.

2. A method according to Claim 1 wherein the transmitting comprises transmitting the data to the different receivers from a single transmitter.

3. A method according to Claim 1 wherein the transmitting is preceded by:

requesting identifiers associated with receivers in the wireless ad-hoc network.

4. A method according to Claim 3 further comprising:

receiving the identifiers associated with the receivers over a channel that is determined by a transmitter that requested the channel identifiers.

5. A method according to Claim 3 wherein requesting comprises transmitting a request for the identifiers over a broadcast channel to which the first and second receivers are configured to listen.

6. A method according to Claim 3 further comprising:

receiving a first identifier from the first receiver over a broadcast channel; and

receiving a second identifier from the second receiver over the broadcast channel.

7. A method according to Claim 6 further comprising:

using the first identifier to transmit the data to the first receiver; and

using the second identifier to transmit the data to the second receiver.

8. A method according to Claim 1 wherein transmitting data to the first receiver further comprises transmitting an identifier associated with a transmitter that transmits the data to the first receiver.

9. A method according to Claim 1 wherein the first and second channels are unique in the wireless ad-hoc network.

10. A method according to Claim 1 wherein the different channels are unidirectional.

11. A method according to Claim 1 wherein the transmitting comprises transmitting the data without identifiers associated with the different receivers.

12. A method according to Claim 1 wherein the transmitting comprises transmitting a first spreading code with the data to the first receiver and transmitting a second spreading code with the data to the second receiver.

13. A method according to Claim 12 wherein at least one of the first and second spreading codes comprises a noise signal.

14. A method according to Claim 12 further comprising:

changing at least one of the first and second spreading codes for subsequent data transmissions.

15. A method according to Claim 1 further comprising:

transmitting data over the first channel defined by the first receiver as a first function; and

transmitting data over the second channel defined by the second receiver as a second function.

16. A method according to Claim 15 wherein the first function comprises a first offset and the second function comprises a second offset.

17. A method according to Claim 16 wherein the first and second offsets comprises first and second frequency offsets.

18. A method according to Claim 16 wherein the first and second offsets comprises first and second time offsets.

19. A method according to Claim 12 further comprising:

transmitting a first composite signal to the first receiver over the first channel, the first composite signal including a first spreading code component and a first modulated information signal component; and

transmitting a second composite signal to the second receiver over the second channel, the second composite signal including a second spreading code component and a second modulated information signal component.

20. A method according to Claim 19 wherein transmitting the first composite signal comprises:

modulating an information signal with the first spreading code to provide the first modulated information signal component;

shifting the first spreading code by a first offset determined by the first receiver to provide a first shifted spreading code component; and

combining the first modulated information signal component with the first shifted spreading code component to provide the first composite signal.

21. A method according to Claim 1 further comprising:

receiving the first data at the first receiver over the first channel; and

receiving the second data at the second receiver over the second channel.

22. A system for communicating in a wireless ad-hoc network, comprising:

means for transmitting data to a first receiver included in a wireless ad-hoc network over a first channel determined by the first receiver; and

means for transmitting data to a second receiver included in the wireless ad-hoc network over a second channel determined by the second receiver.

23. A computer program product for communicating in a wireless ad-hoc network, comprising:

a computer readable medium having computer readable program code embodied therein, the computer readable program product comprising:

computer readable program code configured to transmit data to a first receiver included in a wireless ad-hoc network over a first channel determined by the first receiver; and

computer readable program code configured to transmit data to a second receiver included in the wireless ad-hoc network over a second channel determined by the second receiver.

24. An electronic device for communicating in a wireless ad-hoc network, the electronic device comprising:

a receiver circuit configured to receive data from a first transmitter included in a wireless ad-hoc network over a channel determined by the receiver circuit and configured to receive data from a second transmitter in the wireless ad-hoc network over the channel.

25. An electronic device according to Claim 24 wherein the channel is determined by the receiver as a function.

26. An electronic device according to Claim 24 wherein the data received from the first transmitter comprises a first composite signal including a first spreading code component and a first modulated information signal component; and

wherein the data received from the second transmitter comprises a second composite signal including a second spreading code component and a second modulated information signal component.

27. An electronic device for communicating in a wireless ad-hoc network, the electronic device comprising:

a transmitter circuit configured to transmit data to a first receiver included in a wireless ad-hoc network over a first channel determined by the first receiver and to transmit data to a second receiver included in the wireless ad-hoc network over a second channel determined by the second receiver.

28. An electronic device according to Claim 27 further configured to request identifiers associated with the first and second receivers in the wireless ad-hoc network.

29. An electronic device according to Claim 27 wherein the transmitter circuit is configured to transmit a first spreading code with the data to the first receiver and to transmit a second spreading code with the data to the second receiver.

30. A method according to Claim 29 wherein at least one of the first and second spreading codes comprises a noise signal.

31. An electronic device according to Claim 27 further configured to transmit data over the first channel defined by the first receiver as a first function and configured to transmit data over the second channel defined by the second receiver as a second function.

32. An electronic device according to Claim 31 wherein the first and second functions comprises first and second frequency offsets.

33. An electronic device according to Claim 31 wherein the first and second functions comprises first and second time offsets.

34. An electronic device according to Claim 29 wherein the transmitter circuit is further configured to transmit a first composite signal to the first receiver over the first channel, the first composite signal including a first spreading code component and a first modulated information signal component and configured to transmit a second composite signal to the second receiver over the second channel, the second composite signal including a second spreading code component and a second modulated information signal component.

35. A method of communicating in a wireless ad-hoc network, comprising:

transmitting data to a first receiver included in a wireless ad-hoc network over a first channel defined by a first time parameter determined by the first receiver; and

transmitting data to a second receiver included in the wireless ad-hoc network over a second channel defined by a second time parameter determined by the second receiver.

36. A method according to Claim 35 wherein transmitting data to the first receiver comprising:

transmitting a differentially modulated information signal using as code symbols chip sequences of a length, wherein the length is defined by the time parameter.

37. A method according to Claim 36 wherein the transmitting further comprises:

transmitting the differentially modulated information signal by changing from transmitting a first chip sequence of a length to transmitting a second chip sequence of the length responsive to a first value in the information signal; and

maintaining transmitting either the first or second chip sequence of the length responsive to a second value in the information signal.

38. A method according to Claim 35 wherein transmitting data to the first receiver comprises:

transmitting an information signal, the information signal is segmented to include a plurality of bits provided to the transmitter circuit at a first bit rate during a first time interval, wherein a segment of the plurality of bits is transmitted a number of times at a second bit rate that is greater than the first rate, and wherein the time parameter is defined by the length of the segment.

39. A method according to Claim 38 further comprising:

receiving the information signal at the first bit rate during the first time interval, wherein the segment of the plurality of bits is received the number of times at the second bit rate that is greater than the first rate, wherein the plurality of bits are accumulated the number of times to provide data transmitted to the receiver.

40. A method according to Claim 35 wherein the transmitting data to the first receiver comprises:

transmitting a composite signal in the wireless network, the composite signal comprising a time-shifted up-converted modulated information signal component and an up-converted spreading code component, wherein the time-shifted up-converted modulated information signal component and the up-converted spreading code component are up-converted using a carrier frequency that changes according to a frequency hopping sequence.

41. A method according to Claim 40 wherein a time-shift used to provide the time-shifted up-converted modulated information signal component defines the time parameter.

42. A method according to Claim 40 wherein the transmitting further comprises:

modulating an information signal with the spreading code component to provide a modulated information signal;

delaying the modulated information signal to provide a time-shifted modulated information signal;

up-converting the time-shifted modulated information signal using the carrier frequency to provide an up-converted time-shifted modulated information signal;

up-converting the spreading code component using the carrier frequency to provide an up-converted spreading code component; and

combining the up-converted time-shifted modulated information signal with the up-converted spreading code component to provide the composite signal.

43. A method according to claim 35 further comprising: receiving at the first receiver the signal in the wireless network.

44. A method according to claim 43 wherein the receiving further comprises:

delaying the composite signal by the time parameter to provide a time-shifted received signal; and

demodulating the received signal with the time-shifted received signal to provide a demodulated information signal at the receiver.

45. An electronic device for communicating in a wireless network, the electronic device comprising:

a transmitter circuit configured to transmit a composite signal in a wireless network, the composite signal comprising a modulated information signal component and a spreading code component, wherein the spreading code component is shifted from the modulated information signal by a frequency offset.

46. An electronic device according to Claim 45 wherein the transmitter circuit further comprises:

a modulator circuit configured to modulate an information signal with a spreading code to provide the modulated information signal component;

an up-converter circuit configured to shift the spreading code by a frequency offset to provide a shifted spreading code component; and

a combiner circuit configured to combine the modulated information signal component with the shifted spreading code component to provide the composite signal.

47. An electronic device according to Claim 45 wherein the spreading code component is shifted using the offset frequency relative to a carrier frequency used to up-convert the modulated information signal component, wherein the carrier frequency changes according to a frequency hopping sequence.

48. An electronic device according to Claim 47 wherein the transmitter circuit further comprises:

a modulator circuit configured to modulate an information signal with a spreading code to provide a baseband modulated information signal;

a first up-converter circuit configured to up-convert a spreading code using a frequency offset and the carrier frequency to provide an up-converted shifted spreading code component;

a second up-converter circuit configured to up-convert the baseband modulated information signal using the carrier frequency to provide an up-converted modulated information signal component; and

a combiner circuit configured to combine the up-converted shifted spreading code component with the up-converted modulated information signal component to provide the composite signal.

49. An electronic device according to Claim 45 wherein the transmitter circuit is configured to transmit a first composite signal to a first receiver included in a wireless ad-hoc network over a first channel determined by the first receiver as a first frequency offset; and

wherein the transmitter circuit is configured to transmit a second composite signal to a second receiver included in the wireless ad-hoc network over a second channel determined by the second receiver as a second frequency offset.

50. A method for communicating in a wireless network comprising:

transmitting a composite signal in a wireless network, the composite signal comprising a modulated information signal component and a spreading code component, wherein the spreading code component is shifted from the modulated information signal by a frequency offset.

51. A method according to Claim 50 wherein the transmitting further comprises:

modulating an information signal with a spreading code to provide the modulated information signal component;

shifting the spreading code by a frequency offset to provide a shifted spreading code component; and

combining the modulated information signal component with the shifted spreading code component to provide the composite signal.

52. An electronic device for communicating in a wireless network, the electronic device comprising:

a receiver circuit configured to receive a composite signal in a wireless network, the composite signal comprising a modulated information signal component and a spreading code component, wherein the spreading code component is shifted from the modulated information signal by a frequency offset.

53. An electronic device according to Claim 52 wherein the receiver circuit comprises:

a converter circuit configured to shift the composite signal by the frequency offset to provide a shifted composite signal; and

a demodulator circuit configured to demodulate the composite signal with the shifted composite signal to provide a demodulated information signal at the receiver.

54. An electronic device according to Claim 53 further comprising:

a low pass filter coupled to the demodulator circuit and configured to filter components from the demodulated information signal.

55. An electronic device according to claim 52 wherein the receiver circuit comprises:

first and second converter circuits configured to shift the composite signal by the frequency offset using a mutual phase difference of 90 degrees to provide an in-phase and a quadrature component respectively of the shifted composite signal; and

first and second demodulator circuits configured to demodulate the composite signal with the respective in-phase and a quadrature components of the shifted composite signal to provide an in-phase component of the demodulated information signal and a quadrature component of the demodulated information signal at the receiver.

56. An electronic device according to Claim 53 wherein the converter circuit comprises an image rejection mixer comprising:

first and second modulator circuits configured to provide an in-phase and a quadrature component respectively of the shifted composite signal; and

a combiner circuit configured to combine the in-phase and quadrature components to provide the shifted composite signal.

57. An electronic device according to Claim 55 further comprising:

first and second combining circuits configured to combine the respective in-phase and quadrature components prior to demodulation to provide an in-phase and a quadrature image rejection component respectively of the shifted composite signal.

58. A method according to Claim 50 further comprising:

receiving the composite signal including the modulated information signal component and the spreading code component.

59. A method according to Claim 58 wherein the receiving comprises:

shifting the composite signal by the frequency offset to provide a shifted composite signal; and

demodulating the composite signal with the shifted composite signal to provide a demodulated information signal at the receiver.

60. A method according to Claim 59 further comprising:

filtering the demodulated information signal to filter components from the demodulated information signal.

61. A method according to Claim 50 wherein the spreading code component is shifted using the offset frequency relative to a carrier frequency used to up-convert the modulated information signal component, wherein the carrier frequency changes according to a frequency hopping sequence.

62. A method according to Claim 61 wherein the transmitting further comprises:

modulating an information signal with a spreading code to provide a baseband modulated information signal;

up-converting a spreading code using a frequency offset and the carrier frequency to provide an up-converted shifted spreading code component;

up-converting the baseband modulated information signal using the carrier frequency to provide an up-converted modulated information signal component; and

combining the up-converted shifted spreading code component with the up-converted modulated information signal component to provide the composite signal.

63. A method according to Claim 50 wherein the transmitting comprises:

transmitting a first composite signal to a first receiver included in a wireless ad-hoc network over a first channel determined by the first receiver as a first frequency offset; and

transmitting a second composite signal to a second receiver included in the wireless ad-hoc network over a second channel determined by the second receiver as a second frequency offset.

64. An electronic device for communicating in a wireless network, the electronic device comprising:

a transmitter circuit configured to transmit a differentially modulated information signal using as code symbols chip sequences of a length, wherein the length provides a time parameter.

65. An electronic device according to Claim 64 wherein the time parameter is determined by a receiver circuit to which the differentially modulated information signal is transmitted.

66. An electronic device according to Claim 64 wherein the transmitter circuit is configured to transmit the differentially modulated information signal by changing from transmitting a first chip sequence of a length to transmitting a second chip sequence of the length responsive to a first value in the information signal and maintaining transmitting either the first or second chip sequence of the length responsive to a second value in the information signal.

67. An electronic device according to Claim 66 wherein the first or second chip sequence is changed to a third chip sequence for use in subsequent transmissions.

68. An electronic device according to Claim 66 wherein the transmitter circuit comprises:

a first chip sequence generator circuit configured to provide the first chip sequence of the length; and

a second chip sequence generator circuit configured to provide the second chip sequence of the length, wherein the second chip sequence comprises an inverted first chip sequence.

69. An electronic device according to Claim 68 wherein the length of the chip sequence associated with the transmitter circuit is unique within a multiple access system.

70. An electronic device for communicating in a wireless network, the electronic device comprising:

a transmitter circuit configured to transmit an information signal, the information signal is segmented to include a plurality of bits provided to the transmitter circuit at a first bit rate during a first time interval, wherein a segment of the plurality of bits is transmitted a number of times at a second bit rate that is greater than the first rate, and wherein the length of the segment provides a time parameter.

71. An electronic device according to Claim 70 wherein the time parameter is determined by a receiver circuit to which the information signal is transmitted.

72. An electronic device for communicating in a wireless network, the electronic device comprising:

a transmitter circuit configured to transmit a composite signal in a wireless network, the composite signal comprising a time-shifted up-converted modulated information signal component and an up-converted spreading code component, wherein the time-shifted up-converted modulated information signal component and the up-converted spreading code component are up-converted using a carrier frequency.

73. An electronic device according to Claim 72 wherein the transmitter circuit further comprises:

a modulator circuit configured to modulate an information signal with the spreading code component to provide a modulated information signal;

a delay circuit configured to delay the modulated information signal to provide a time-shifted modulated information signal;

a first up-converter circuit configured to up-convert the time-shifted modulated information signal using the carrier frequency to provide an up-converted time-shifted modulated information signal;

a second up-converter circuit configured to up-convert the spreading code component using the carrier frequency to provide an up-converted spreading code component; and

a combiner configured to combine the up-converted time-shifted modulated information signal with the up-converted spreading code component to provide the composite signal.

74. An electronic device according to Claim 72 wherein the carrier frequency changes according to a frequency hopping sequence.

75. An electronic device for communicating in a wireless network, the electronic device comprising:

a receiver circuit configured to receive a signal over a channel that is defined by the receiver by a time parameter.

76. An electronic device according to Claim 75 wherein the receiver circuit further comprises:

a delay circuit configured to delay the received signal to provide a time-shifted received signal; and

a first demodulator circuit configured to demodulate the received signal with the time-shifted received signal to provide a first demodulated information signal at the receiver.

77. An electronic device according to Claim 76 further comprising:

a low-pas filter configured to filter components from the first demodulated information signal.

78. An electronic device according to Claim 75 wherein the information signal is segmented to include a plurality of bits provided at a first bit rate during a first time interval, wherein a segment of the plurality of bits is received a number of times at a second bit rate that is greater than the first rate, and wherein the length of the segment provides a time parameter that is defined by the receiver.

79. An electronic device according to Claim 78 wherein the receiver circuit comprises:

a plurality of sequential delay circuits equal in number to the number of times the segment of the plurality of bits is received, wherein each of the plurality of sequential delay circuits is configured to delay an input thereto by the time parameter to provide an output therefrom to provide a plurality of outputs; and

a summing circuit configured to sum the plurality of outputs.

80. An electronic device according to Claim 76 wherein the receiver further comprises:

a phase shifter to phase shift the time-shifted received signal; and

a second demodulator circuit configured to demodulate the received signal with the phase-shifted time-shifted received signal to provide a second demodulated information signal at the receiver, the first demodulated information signal being an in-phase component of the demodulated information signal and the second demodulated information signal being a quadrature component of the demodulated information signal.

81. A system for communicating in a wireless network, comprising:

means for transmitting an up-converted signal, wherein the up-converted signal is up-converted using a carrier frequency;

means for receiving the up-converted signal; and

means for demodulating the received up-converted signal without using the carrier frequency.

82. A system according to Claim 81 wherein the carrier frequency changes according to a frequency hopping sequence.

83. An electronic device for communicating in a wireless network, comprising:

a first receiver configured to receive a composite signal including a modulated information signal component corresponding to a first portion of a data transmission and a spreading code component used to modulate the information signal to provide an indication that the data transmission is addressed to the electronic device; and

a second receiver coupled to the first receiver configured to begin operation responsive to the indication that the data transmission is addressed to the electronic device.

84. An electronic device according to Claim 83 wherein the first receiver comprises a radio frequency identification tag receiver.

85. An electronic device for communicating in a wireless network, comprising:

a receiver configured to receive a composite signal including a first modulated information signal component and a first spreading code component used to modulate the information signal that corresponds to a first portion of a data transmission, and configured to receive a second modulated information signal component corresponding to a second portion of the data transmission being modulated with a second spreading code that is different than the first spreading code.

86. An electronic device according to Claim 85 wherein the first spreading code comprises a transmitted reference signal transmitted to the receiver with the first modulated information signal as part of the composite signal.

87. An electronic device according to Claim 85 wherein the second spreading code comprises a spreading code locally generated separately at the transmitter and locally at the receiver.

88. An electronic device according to Claim 85 wherein the first portion of the data transmission further comprises seed information to indicate a starting point for the generation of the second spreading code.

89. An electronic device for communicating in a wireless network, comprising:

a transmitter configured to transmit a composite signal including a first modulated information signal component and a first spreading code component used to modulate the information signal that corresponds to a first portion of a data transmission, and configured to transmit a second modulated information signal

component corresponding to a second portion of the data transmission being modulated with a second spreading code that is different than the first spreading code.

90. A method for communicating in a wireless network, comprising:

receiving at a first receiver circuit a composite signal including a modulated information signal component corresponding to a first portion of a data transmission and a spreading code component used to modulate the information signal to provide an indication that the data transmission is addressed to an electronic device including the first receiver circuit; and

beginning operations of a second receiver circuit coupled to the first receiver circuit responsive to the indication that the data transmission is addressed to the electronic device.

91. A method for communicating in a wireless network, comprising:

receiving a composite signal including a first modulated information signal component and a first spreading code component used to modulate the information signal that corresponds to a first portion of a data transmission; and

receiving a second modulated information signal component corresponding to a second portion of the data transmission being modulated with a second spreading code that is different than the first spreading code.

92. A method of communicating in a wireless ad-hoc network, comprising:

transmitting data to different receivers included in a wireless ad-hoc network over different channels.

93. A method according to Claim 92 wherein the different receivers comprise at least first and second receivers and the different channels comprise at least a first channel over which the first receiver receives the data and a second channel over which the second receiver receives the data.

94. A method according to Claim 93 wherein the first channel is determined by the first receiver and the second channel is determined by the second receiver.